

Citation:

Bagnardi V, Zatonski W, Scotti L, La Vecchia C, and Corrao G. (2008). Does drinking pattern modify the effect of alcohol on the risk of coronary heart disease?: Evidence from a meta-analysis. *Journal of Epidemiology and Community Health*, 2008 62 (7), 615-619.

PubMed ID: [18559444](#)

Study Design:

Meta-analysis or Systematic Review

Class:

M - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To evaluate whether drinking pattern, defined by the frequency of drinking days as well as drinking intensity per drinking occasion, modified the effect of alcohol intake on the risk of coronary heart disease (CHD).

Inclusion Criteria:

- Published in English
- Published as an original research article
- Must have reported sufficient data to perform statistical analysis [relative risks (RR), odds ratio (OR), hazard ratio (HR) and its precision (variance, standard error, confidence interval) or the absolute number of cases and non-cases for each exposure category]
- Must have considered either different combinations of quantity and frequency of alcohol intake or directly defined the drinking pattern as exposure categories
- Must have considered abstainers as reference category or at least reported data allowing to recalculate RRs with respect to abstainers.

Exclusion Criteria:

- Not concerned with topic
- No information on irregular drinking pattern provided
- No risk measure
- Investigation of overall mortality rather than CHD
- Exposure subsequent to cardiovascular event
- Reference category was not adequate
- Studies on intake only during the day before onset of coronary event.

Description of Study Protocol:

Search Procedures

- Searched Medline; searched references listed in articles listed on Medline, reviews published on topic or meta-analysis published on topic
- Publication between 1966 and 2006
- Keywords listed as disease (coronary heart disease, coronary death, myocardial infarction, ischemic heart disease), exposure (quantity or dose of alcohol intake and pattern of alcohol drinking) and frequency of alcohol drinking (regular, irregular, problem drinking, alcoholic intoxication, heavy episodic drinking, hangover).

Was study quality assessed?

Study quality was assessed based on inclusion and exclusion criteria; additionally study quality was determined based on design.

Type of Intervention and Outcomes Investigated, Population Included

- To determine if the pattern of alcohol drinking implies different RRs of CHD when compared to abstainers and whether frequency of drinking days per week modifies the dose-response relationship between the total amount of alcohol intake consumed in a week and CHD risk.
- Adult males and females.

Data Collection Summary:

What type of information was abstracted from articles?

- Design (cohort or case control)
- Outcome (incident case or death)
- First author
- Year of publication
- Study population (country, size, age and gender)
- Duration of follow-up (for cohort studies)
- Source of controls (hospital or population -based for case-control studies)
- Definition of exposure categories
- Absolute number of cases and non-cases, RR and corresponding precision for each exposure category, stratified by gender when available.

How was it combined?

Pooled estimates and corresponding 95% confidence intervals were obtained for each exposure category. Each was compared to abstainers.

What analytic methods were used, if any?

Flexible meta-regression models were fitted. The comparison between two hierarchical models was tested by the likelihood ratio test. Significance offers evidence that drinking pattern modifies the dose-risk relation between alcohol intake and CHD risk.

Description of Actual Data Sample:

Number of Articles Included

Six articles included.

Number of Articles Identified

1,032 articles retrieved.

Number and Type of Studies Reviewed

- Four cohort studies (N=41,946 subjects, 3,329 coronary events were observed during 5.7 to 16.3 years of follow-up)
- Two case-control studies (N=12,018 cases and 6,555 controls).

Sample Size of Studies, and Characteristics of the Study Participants

- Murray, 2002
 - 1,154 Canadian males and females aged 18-64 years
- Malyutina, 2002
 - 6,502 Russian males aged 25-64 years
- Makela, 2005
 - 6,394 Finnish males and females aged 25-69 years
- Tolstrup, 2006
 - 27,896 Danish males and females aged 50-65 years
- McElduff, 1997
 - 11,511 Australian males and females aged 35-69 years with 6,077 population controls
- Augustin, 2004
 - 507 Italian males and females aged 25-79 years with 478 hospital controls.

Summary of Results:

- Six individual effects looking at heavy regular drinking affecting CHD risk were used. Individual RRs associated with heavy regular drinking ranged from 0.4 to 1.4 with a pooled RR of 0.75 (95% confidence interval 0.64 to 0.89). Between study variation across individual estimates for heavy regular drinking were significant ($P < 0.01$).
- 10 individual effects looking at heavy irregular/binge drinking affecting CHD risk were used. Individual RRs associated with heavy irregular/binge drinking ranged from 0.7 to 2.3 with a pooled RR of 1.10 (95% confidence interval 1.03 to 1.17). Between study variation across individual estimates for heavy irregular/binge drinking were not significant ($P = 0.088$).
- The two pooled RRs from heavy regular drinking and heavy irregular drinking/binge drinking were significantly different ($P < 0.001$)
- The dose-response function for regular drinkers showed an L-shaped curve with significant protective effects even for the highest dose of alcohol intake
- A J-shaped curve was found for irregular drinkers: The nadir and the last protective dose were 28 g per week (RR 0.59; 95% confidence interval 0.53 to 0.65) and 131 g per week (RR 0.85; 95% confidence interval 0.72 to 0.99), respectively
- The dose-risk curves were significantly different ($P = 0.047$).

Author Conclusion:

This meta-analysis, including most published information on alcohol drinking pattern and CHD, offers evidence that drinking pattern modifies the action of alcohol intake on the CHD risk. In particular, the well-established protective effect of alcohol on CHD risk is confirmed for regular

drinkers, even with heavy amounts of alcohol intake. Conversely, compared with abstainers, binge and heavy irregular drinkers are at increased risk of CHD.

Reviewer Comments:

This meta-analysis was tightly controlled and conducted. The studies included and statistical analysis used demonstrate the high quality of this study. There were some limitations, such as small number of studies included, but this was limited by availability of adequate studies and publication bias concerning this topic.

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions

- | | | |
|----|---|-----|
| 1. | Will the answer if true, have a direct bearing on the health of patients? | Yes |
| 2. | Is the outcome or topic something that patients/clients/population groups would care about? | Yes |
| 3. | Is the problem addressed in the review one that is relevant to nutrition or dietetics practice? | Yes |
| 4. | Will the information, if true, require a change in practice? | Yes |

Validity Questions

- | | | |
|----|--|-----|
| 1. | Was the question for the review clearly focused and appropriate? | Yes |
| 2. | Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search terms used described? | Yes |
| 3. | Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased? | Yes |
| 4. | Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible? | Yes |
| 5. | Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined? | Yes |
| 6. | Was the outcome of interest clearly indicated? Were other potential harms and benefits considered? | Yes |
| 7. | Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issues considered? If data from studies were aggregated for meta-analysis, was the procedure described? | Yes |
| 8. | Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included? | Yes |

9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	Yes